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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,530	11/03/2003	Hou-Wei Lin	LINH3022/EM	1416

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EXAMINER	
FOTAKIS, ARISTOCRATIS	
ART UNIT	**PAPER NUMBER**
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/698,530	LIN ET AL.	
	Examiner	Art Unit	
	Aristocratis Fotakis	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after t he mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/03/2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims are rejected under 35 U.S.C. 103(a) as being unpatentable over Agazzi et al (US 6,201,796) in view of Yousef et al (US 7,027,504).

Re claims 1, 10 and 20, Agazzi teaches of an initialization method (start-up) for use in a communication system having a plurality of transceivers, wherein the transceivers includes a master transceiver and a slave transceiver coupled to the master transceiver via a channel, each of the transceivers respectively having a noise canceller system (*noise reduction system*), a timing recovery, and a equalizer system (Abstract, Lines 1 – 5 and Col 14, Lines 6 – 11, Figs 7, 12 and 13), the method comprising: executing a first stage (Abstract, Lines 6 – 9 and Col 12, Lines 1 – 21, first phase, #114, Fig.13), wherein the first stage at least comprises the steps of: transmitting a first idle sequence by the master transceiver (Col 12, Lines 4 – 8); executing signal detection by the slave transceiver (Col 12, Lines 10 – 13); and training the timing recovery in both frequency and phase and the equalizer system of the slave transceiver (Col 12, Lines 11 – 22); executing a second stage (Abstract, Lines 9 – 12 and Col 12, Lines 22 – 67 to Col 13, Lines 1 – 20, second phase, #116, Fig.13), wherein the second stage at least comprises the steps of: transmitting a second idle sequence by the slave transceiver (Col 12, Lines 22 – 36); executing signal detection by the master transceiver (Col 12, Lines 33 – 36); and training the timing recovery in phase,

the equalizer system, and the noise canceller system of the master transceiver (Col 12, Lines 54 – 67) while training the noise canceller system of the slave transceiver (Col 12, Lines 54 – 57); and executing a third stage (Abstract, Lines 12 – 16 and Col 13, Lines 35 – 65, third phase, #118, Fig.13), wherein the third stage at least comprises the steps of: training the timing recovery in phase, the equalizer system of the master transceiver (Col 13, Lines 45 – 50) while training the timing recovery in both frequency and phase and equalizer system of the slave transceiver (Col 13, Lines 40 - 45). However, Agazzi does not specifically teach of channel estimation and determining a plurality of initial coefficients of the equalizer system of the slave transceiver/master transceiver according to the result of channel estimation.

Yousef teaches of the use of equalizers being essential building blocks of modem receivers, especially in broadband applications where inter-symbol-interference is a critical problem. In a typical equalizer, the channel between the transmitter and the receiver is first estimated based upon the training sequence contained in one or more preambles. Then optimal equalizer coefficients (also referred to as taps and/or tap coefficients for the equalizer) are estimated based upon the channel estimate. The optimal equalizer coefficients are then used by the equalizer in extracting the data from the packet (Col 1, Lines 50 – 65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have executed channel estimation on both the master and slave transceivers of the first and second stages and to determine a plurality of initial coefficients of the equalizer system of the slave transceiver according to the result of

channel estimation so as to remove the channel effects from the received symbol stream (Col 1, Lines 50 - 55).

Re claims 2, 11 and 24, Agazzi and Yousef teach all the limitations of claims 1, 10 and 20. Agazzi teaches of the signal detection executed before the step of training by the slave transceiver during the first stage (Col 12, Lines 10 – 16). However, Agazzi does not specifically teach of channel estimation (as discussed above) executed before the step of training by the slave transceiver during the first stage.

Yousef teaches of a typical equalizer, the channel between the transmitter and the receiver is first estimated based upon the training sequence contained in one or more preambles. Then optimal equalizer coefficients (also referred to as taps and/or tap coefficients for the equalizer) are estimated based upon the channel estimate. The optimal equalizer coefficients are then used by the equalizer in extracting the data from the packet (Col 1, Lines 50 – 65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have executed channel estimation executed before the step of training by the slave transceiver during the first stage so as to determine a plurality of initial coefficients of the equalizer system of the slave transceiver to be used by the equalizer in extracting the data from the packet. (Col 1, Lines 50 - 55).

Re claim 3, Agazzi and Yousef teach all the limitations of claims 1, 10 and 20. Agazzi teaches of the signal detection executed before the step of training by the master transceiver during the second stage (Col 12, Lines 40 – 48). However, Agazzi does not specifically teach of channel estimation (as discussed above) executed before the step of training by the master transceiver during the second stage.

Yousef teaches of a typical equalizer, the channel between the transmitter and the receiver is first estimated based upon the training sequence contained in one or more preambles. Then optimal equalizer coefficients (also referred to as taps and/or tap coefficients for the equalizer) are estimated based upon the channel estimate. The optimal equalizer coefficients are then used by the equalizer in extracting the data from the packet (Col 1, Lines 50 – 65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have executed channel estimation executed before the step of training by the master transceiver during the second stage so as to determine a plurality of initial coefficients of the equalizer system of the master transceiver to be used by the equalizer in extracting the data from the packet. (Col 1, Lines 50 - 55).

Re claims 4 and 12, Agazzi teaches of the step of signal detection in the first stage for detecting the idle sequence (start-up) transmitted by the master transceiver (Col 12, Lines 4 – 16) and the step of signal detection in the second stage for detecting the idle sequence transmitted by the slave transceiver (Col 12, Lines 22 – 36).

Re claims 5, 13 and 21, Agazzi teaches of the noise canceller system of each transceiver includes an echo canceller (#40, Fig.7) and a NEXT (Near-End Cross-Talk) canceller (#38, Fig.7).

Re claims 6, 14 and 22, Agazzi teaches of the equalizer system of each transceiver includes a FFE (Feed Forward Equalizer) and a FBE (Feed Back Equalizer) (Col 12, Lines 22 – 36 and Col 12, Lines 54 – 67).

Re claims 7 and 15, Agazzi and Yousef teach of the step of channel estimation is for estimating at least one of the channel characteristics as discussed above in claims 1 and 10.

Re claims 9, 19 and 25, Agazzi teaches of the timing recovery of the slave transceiver is trained in both frequency and phase in the first and the third stage, the frequency and the phase of the timing recovery of the slave transceiver are trained separately (Col 12, Lines 15 – 21 and Col 13, Lines 35 – 45).

Re claims 17, Agazzi teaches of the timing recovery, the equalizer system, and the noise canceller system of the second transceiver are trained separately (Figs.7 and 8).

Re claims 18, Agazzi teaches of the equalizer trained before the noise canceller system and the timing recovery (Figs.7 and 8).

Re claims 24, Agazzi teaches of the equalizer is trained before the noise canceller system and the timing recovery (Figs.7 and 8).

Claims 8, 16 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agazzi et al and Yousef et al in view of Dubrovin et al (US 6,977,977).

Agazzi and Yousef teach all the limitations of claims 7, 15 and 20 except of specifically teaching that at least one of channel characteristics includes channel length.

Dubrovin teaches of a novel and useful apparatus for and method of I/Q gain mismatch compensation for use in a communications receiver by calculating an estimate of the I/Q gain mismatch. Each input sample is subsequently multiplied by the inverse of the estimate to generate compensated samples. The training sequence portion of the uncompensated input samples is used to generate the I/Q gain mismatch estimate. The H matrix used in calculating the gain mismatch estimate is pre-calculated for several channel lengths and stored in memory. An estimate of the channel (Col 9, Lines 55 – 61) is generated which provides the channel length and the location in the

input sample buffer of the first training sequence sample to be used in calculating the gain mismatch estimate (Abstract and Col 14, Lines 10 – 52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have determined the channel length by the channel estimation procedure in order to compensate for any gain mismatches in the receiver system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aristocratis Fotakis whose telephone number is (571) 270-1206. The examiner can normally be reached on Monday - Thursday 7 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AF

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER